

tion of the Solar Eclipse of the year 1860 (see *Astron. Nachrichten*, No. 1340, p. 308). It may be of some interest to give you the whole description of what I had seen in Frankfort-on-the-Maine on the afternoon of the 7th September, 1820.

I was in my uncle's house, one hundred and twenty paces only from my father's, when the darkness began. I left the house; but I had scarcely gone twenty paces in the street, from East to West exactly, when I saw the moving shadows coming towards me, covering the large and deserted street, and passing under my feet. Their movement was slow, for otherwise I could not have perceived them so distinctly, with the eyes so nearly fixed on them; the movement was not rapid. The aspect was like the shadow of smoke in sunshine—regular in translation; the forms, like rhomboids of four or six inches in diameter, and sometimes more extensive, were mixed with superposed shadows of the same size, and ribbon-like forms. The inner spaces particularly, filled with round spots softly melted and mixed with the whole in veiled grey transparency, gave to the phenomenon a somewhat mysterious appearance. Thus, looking to the paved street, these ribbons and spots flitted under my feet, till I arrived at a group of men near my father's house, after having made one hundred steps in contemplating this strange apparition. At this moment the annular eclipse was forming: the light of the Sun ran around the Moon in a very singular manner—it seemed like a fluid mass. I can truly estimate the time from the moment when I saw the shadows till the forming of the annulus—an interval of two minutes and thirty seconds.

I spread a large white cloth at my feet in Vitoria, but I had no time to look on it, absorbed by other business and the people who rushed in.

I had recommended this observation to Captain Manheim, who really saw the fringes at Constantine in the year 1860.

*Paris, February 2nd, 1863.*

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*On the Determination of the Longitude of Valencia, in Ireland, by Galvanic Signals, in the Summer of 1862.*  
By G. B. Airy, Esq., Astronomer Royal. (Abstract.)

The Astronomer Royal adverts to the operation effected in 1844 for the determination of the longitude of the Feagh Main Station, in Valencia, by the transmission, ten times in both directions, of thirty pocket-chronometers, between Greenwich and Feagh Main; a transit instrument having been erected at Feagh Main, and the chronometers being compared with the transit-clocks at Greenwich and Feagh Main. Advantage was taken of the passage through Liverpool and

Kingston to determine the longitudes of the Liverpool Observatory and of a station near Kingston Harbour. The longitudes then found were

Liverpool Observatory, West of Greenwich	<sup>m</sup> 12	<sup>s</sup> 00.5
Kingstown Station	24	31.20
Feagh Main Station	41	23.23

For details, he refers to *Mem. Roy. Ast. Soc.*, vol. xvi., or *Greenwich Observations*, 1845.

After the completion of galvanic communication between London and Valencia (consequent on the laying down of the Atlantic Telegraph), and the connexion, through the agency of the London District Telegraph and the British and Irish Magnetic Telegraph, between Greenwich and the London Offices of the B. and I. M. Telegraph Company, the Astronomer Royal, with the assured assistance of Sir Charles T. Bright and E. B. Bright, Esq. (Engineer and Managing Officer of that Company), and of T. B. Moseley, Esq., (their London Resident Officer), decided on repeating the determination by galvanic signals. The principal motive for this was, the desire of co-operating with M. Struve in establishing an Arc of Parallel from Valencia in the West to Orsk, on the river Oural, in the East. The station now adopted was not that of Feagh Main, but a place in Knightstown, in the vicinity of the Telegraph Office.

Sir Henry James and Captain Clarke, R.E., gave great assistance in the loan of observing hut, the conveyance of instruments, and other ways; and the Knight of Kerry and R. J. Leckie, Esq., contributed all the local aid that was required.

It was determined that local time at Valencia should be found entirely by observation of zenith distances, and a 12-inch Altazimuth (by Simms) was lent for this purpose by T. Coventry, Esq. The signals were simply movements of a galvanometer-needle at each station, the current being given at every 15<sup>s</sup> nearly by an auxiliary clock.

The observers, Mr. Dunkin and Mr. Criswick, remained at Valencia from June 11 to July 23. During this time there were few opportunities of star-observation in consequence of the continued bad weather, and few opportunities of observing galvanic signals in consequence of interruptions at the Telegraph Office of Mallow. On the whole, only six nights of effective signals with good determinations of local time were obtained. The Valencia observer throughout was Mr. Dunkin, and the Greenwich observer of signals Mr. Ellis.

On reducing the altazimuth observations, great anomalies presented themselves in the determination both of latitude and of time. After carefully discussing the observations, and

making some experiments at Greenwich, it became clear that the zenith-distances were always given too great by about 4". The cause of this anomaly is not known. On applying the corresponding correction, the results were made harmonious. It is remarked, however, that very little depended on this correction, the observations having been well balanced on the East and West sides of the meridian.

The signal-observations were then discussed nearly in the same way as in the determination of the longitude of Brussels (*Mem. Roy. Ast. Soc.*, vol. xxiv.), and the results were the following :—

Time occupied in the passage of the current	<sup>m</sup> 0	<sup>s</sup> 0.129
Longitude of the Knightstown Station . . . .	41	9.81

By the kindness of Captain Clarke a geodetic connexion was made between the Feagh Main Station and the Knightstown Station, and their geodetic difference of longitude was found to be 13°.56. Applying this to the former determination for Feagh Main, it is found that the old operations would have given for Knightstown 41<sup>m</sup> 9°.67. The agreement of this with that found from the galvanic operation is very remarkable, and it proves that implicit confidence may be placed in the old determinations for Liverpool and Knightstown.

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*On the Movement of the Solar System in Space, deduced from the Proper Motions of 1167 Stars.* By Edwin Dunkin, Esq., of the Royal Observatory, Greenwich.—(Abstract.)

The investigation which forms the subject of this Memoir, may be considered as a supplement or addendum to that of the Astronomer Royal, *On the Movement of the Solar System in Space*, published in vol. xxviii. of the Society's *Memoirs*. The method of calculation differs in no respect from that previously used, excepting that the Proper Motions of a much greater number of stars have been combined in producing the results. It is intended, therefore, that this paper should be read in connexion with the memoir of Mr. Airy, as the mathematical explanation, which has been given in detail by him, is not generally repeated on this occasion.

In this memoir, the Proper Motions of nearly all the stars contained in the Catalogues of the Rev. R. Main, have been adopted, numbering in all 1167 stars. In Right Ascension they are scattered in nearly equal proportions over the twenty-four